prove disastrous to the district if the matter is continually neglected." The district is at present remarkably deficient in opportunities for higher education. With a population approaching half a million within easy reach of the centre, there is no institution where young people who have left the secondary school can obtain higher instruction nearer than Manchester (thirty-seven miles) or Birmingham (forty-five miles). Evidently there is room for further provision of educational facilities by the establishment of an institution of the rank of a University College; and it is satisfactory to know that another locality is being aroused to a sense of its educational deficiencies.

SCIENTIFIC SERIAL.

Bulletin of the American Mathematical Society, April, 1901.—Prof. F. N. Cole opens with an account of the proceedings at the February meeting of the Society in New York City, and, in addition to the titles of the nineteen papers communicated, gives an abstract of several of them. Three of the papers are printed. Their titles are: (1) Green's functions in space of one dimension, by Prof. M. Bôcher. The results arrived at are given, but the proofs and further developments are reserved; (2) Possible triply asymptotic systems of surfaces, by Dr. L. P. Eisenhart. This supplements a note by the author, in the January *Bulletin*, entitled, "A demonstration of the impossibility of a triply asymptotic system of surfaces." Instead of the general negation previously given, the author now gives the qualified one: The only triple systems of surfaces cutting mutually in the real asymptotic lines of these surfaces are composed of properly associated families of hyperboloids of one sheet and hyperbolic paraboloids; (3) Note on Hamilton's determination of irrational numbers, by Dr. H. E. Hawkes. The purpose of the note is to call attention to Hamilton's use of the partition (Schnitt) in his definition of certain irrational numbers (*Trans.* of the R. Irish Academy, vol. xvii. 1837, p. 293).—On a system of plane curves having factorable parallels, by Dr. V. Snyder, was read before the December meeting of the Society. The type of scrolls contained in a linear congruence, and having factorable asymptotic lines, gives rise to a class of plane curves whose parallels have a similar property (cf. a paper by the author, in the *American Journal of Mathematics*, vol. xxiii., on a special form of annular surface). Mr. Bromwich gives a very useful analysis of Dr. P. Muth's "Theorie und Anwendung der Elementartheiler" (1899, xvi. and 236 pp.), and hopes that the book may induce its readers to take up the special part of invariant theory treated in it. Mr. Bromwich has done good work in this direction (see *Proc.* of London Math. Soc. vol. xxxii. 1900, p. 98), where he gives a list of papers on the subject.—Short notices follow of Dr. R. Fricke's "Kurzgefasste Vorlesungen über Verschiedene Gebiete der höheren Mathematik, mit Berüchsichtigung der Anwendungen" (1900), and Dr. R. Böger's "Ebene Geometrie der Lage" (1900), both by Prof. H. S. White.—The notes are very copious and interesting, giving account of the courses of lectures in the Continental and home Universities, and the usual new publications close the number.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, February 28.—"A Preliminary Account of the Development of the Free-swimming Nauplius of *Leptodora hyalina* (Lillj.)." By Ernest Warren, D.Sc. Communicated by Prof. Weldon, F.R.S.

March 14.—"On the Preparation of Large Quantities of Tellurium." By Edward Matthey, A.R.S.M. Communicated by Sir George Stokes, Bart., F.R.S.

March 28.—"On the Enhanced Lines in the Spectrum of the Chromosphere." By Sir Norman Lockyer, K.C.B., F.R.S., and F. E. Baxandall, A.R.C.S.

In the recently published account (*Ast. Phys. Journ.* vol. xii. p. 307, 1900) of the spectroscopic results obtained by members of the expedition from the Yerkes Observatory during the solar eclipse of May 28, 1900, Prof. Frost claims to have established a close relationship between the bright lines in his eclipse spectra and the stronger lines of the Fraunhofer spectrum, and states that "61 per cent. of the latter were measured as bright on the plates."

He also states that "these plates give no evidence of any relationship between the bright lines and the 'enhanced' lines, or lines distinctly more intense in the spark than in the arc spectrum, although Sir Norman Lockyer has attached much significance to a supposed connection between them." He quotes specially the cases of titanium and iron lines, and of 48 enhanced lines of the former element acknowledges that 29—or 60 per cent.—correspond with lines in his eclipse spectra

The authors of the present paper show that if a difference of 0·3 tenth-metres be allowed between the wave-length of an eclipse line and that of the corresponding metallic line (and in some cases Prof. Frost accepts a difference of 0·35 or more between his adopted wave-length and Rowland's wave-length of the corresponding Fraunhofer line), there are 38 of the 48 enhanced titanium lines—or 80 per cent.—which have corresponding lines in the eclipse spectra, thus showing a closer relationship between the enhanced lines of titanium and the eclipse lines than that claimed by Prof. Frost between the latter and the stronger of the Fraunhofer lines.

To show the difference in behaviour in the eclipse spectra of the enhanced and unenhanced lines, several tables have been compiled. The first contains all the Fraunhofer lines in the region covered by Frost's eclipse spectra which have an intensity of 2 or greater, and which Rowland has ascribed to titanium only. These are 53 in number, 20 are enhanced lines and 33 are not. The comparison table indicates that 19 of the 20 enhanced lines have corresponding lines (nearly all prominent) in the eclipse spectra, the remaining one being probably masked by Hγ. Of the 33 unenhanced lines, 23—or 70 per cent.—do not correspond with eclipse lines. Of the nine eclipse lines which do agree in position with unenhanced titanium lines, three are nearly certainly due to other metals, and the remainder are lines of insignificant intensity.

The second table gives the enhanced lines of titanium which are recorded by Hasselberg in the arc spectrum, and a comparison is made with Frost's eclipse lines. This table shows that though the "arc" intensities of the enhanced lines vary from 2 to 7 (max. = 8), they have nearly all corresponding lines in the eclipse spectra, the majority of the latter being quite prominent.

The third table contains all the strongest lines (Int. 7 and 8) in Hasselberg's list of arc lines which are unenhanced. It is shown that only 7 out of 20 have corresponding eclipse lines. To three of these Frost gives no origin, to the others he gives compound origins, three of them involving titanium. In no case is the eclipse line as strong as the majority of those which are the representatives of the enhanced lines.

In the case of iron a similar analysis is given, but only over a limited region of the spectrum (λ 4500 to λ 4600) owing to the great number of lines in the iron spectrum. The same results are arrived at, viz., that the enhanced lines, though insignificant in the iron spectrum so far as intrinsic intensity is concerned, are, in the main, represented in the eclipse spectra by lines of abnormal intensity, whereas many of the stronger iron lines are either not represented at all, or only by weak lines.

"On the Arc Spectrum of Vanadium." By Sir Norman Lockyer, K.C.B., F.R.S., and F. E. Baxandall, A.R.C.S.

In this paper the authors give a list of lines in the arc spectrum of vanadium which have been measured from photographs taken at Kensington with a Rowland concave grating of 21½ feet focus and 14,438 lines to the inch. The region of the spectrum investigated extends from λ 3887 to λ 4932. The sources of the spectrum were (1) vanadium chloride, and (2) a pure sample of vanadium oxide supplied by Sir Henry Roscoe. These were volatilised in the arc between poles of the purest silver obtainable, and which were furnished by Sir W. C. Roberts-Austen.

The lines are compared with those published previously by Rowland (*Ast. Phys. Journ.* vol. vii. p. 273, 1898) and Hasselberg (*Svenska-Vetenskaps. Akad. Handl.* vol. xxxii. No. 2, 1899). The three records contain many lines in common, but there are also many differences between any two of them. The lines special to any one list have been analysed with the object of either properly establishing their claim to be accepted as true vanadium lines, or possibly tracing them to their true origin. Lines in the Kensington spectra which are due to impurities have been eliminated, as far as possible, by comparing the vanadium spectrum directly with those of forty-three other elements. They are twenty-nine in number, and are traces of the strongest lines only of Fe, Mn, Cr, Co, Ca, Al, Sr and Ag.

Forty-four lines occur in Rowland's list only; thirteen of these have been traced with certainty to impurities of Ca, Mn, Al, Pb or Sr. No origin other than vanadium has been found for the remainder. A list of lines is given which Rowland has previously identified with solar lines, but which, for some reason or other, are missing from his latest list of vanadium lines.

There are 194 lines which occur in the Kensington list only. No other origin has been found for them from a comparison of the vanadium spectrum with those of the forty-three metals which have been photographed on the same scale. As they appear both in the spectrum of the chloride and oxide they are probably genuine vanadium lines.

"The Growth of Magnetism in Iron under Alternating Magnetic Force." By Ernest Wilson. Communicated by Prof. J. M. Thomson, F.R.S.

The subject of the shielding effects of induced currents due to changes of magnetic induction in plates of iron has been dealt with theoretically by Profs. J. J. Thomson (*Electrician*, vol. xxviii. p. 599) and J. A. Ewing (*Electrician*, vol. xxviii. p. 631). The same subject has been attacked by experiment in the case of iron cylinders (*Phil. Trans.* R.S. A vol. clxxxvi., 1895, pp. 93-121, and *Journal* Inst. Elec. Engineers, vol. xxiv. p. 195), and the object of the present paper was to carry out further experiments with alternating magnetic force.

The magnet consists of a solid iron cylinder 12 inches in diameter and 18 inches long, around which the magnetising coil is wound. The magnet circuit is completed by means of a ring concentric with the cylinder and a circular slab of iron at each end.

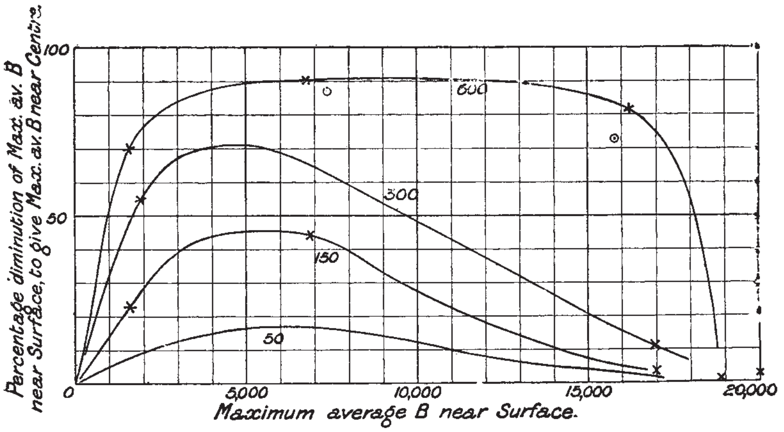


FIG. 1.

In order that changes of magnetism may occur at the centre of the cylinder it was necessary to employ alternating currents of long periodic time. Such times vary from 2·5 to 10 minutes in the experiments. It would be difficult to obtain such currents by means of electro-magnetic apparatus. A liquid reverser consisting of copper plates in dilute $CuSO_4$ solution was employed and gave satisfactory results.

For the purpose of observing the changes of magnetic induction at different points of the cylinder a series of holes were drilled in a plane perpendicular to the axis and half way along its length. Insulated copper wires were then threaded through these holes in such manner that each circuit enclosed an element of the cross-sectional area of the cylinder. Four such elements were enclosed between the centre and the circumference, and a fifth coil was wound completely round the cylinder, as it was required to take account of the average change of induction over the whole area. In the circuit of each of these five coils was placed a dead-beat galvanometer, the deflection of which enabled the E.M.F. to be observed. The epoch for the simultaneous observations of E.M.F. as well as the current in the magnetising coil was determined by the operator at the reverser counting seconds aloud. The E.M.F. curves were ultimately plotted in terms of time and integrated.

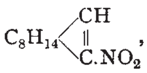
Before dealing with the experiments it may be stated that the results obtained are applicable to cylinders of other diameter than 12 inches. Similar electric and magnetic events will happen in cylinders of different diameters, but at times varying inversely as the square of their linear dimensions. Thus a periodic time of 10 minutes with the 12-inch cylinder corresponds to a frequency of 150 periods per second with a wire 1 mm. diameter.

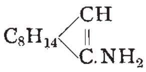
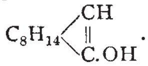
Two variables have been dealt with, namely the frequency of the magnetising force H, due to the current turns in the copper coils of the magnet, and its amplitude. The figure gives one set of results obtained at 15° C. Each curve refers to a definite periodic time, and the number near it gives the frequency for a wire 1 mm. in diameter. The point of interest is that for a given frequency when the limits of the induction density, B, at the surface, are small, that is, the average permeability is small, the limits of B at the centre of the cylinder do not differ greatly from those at the surface. With larger limits of B at the surface, corresponding to a large average permeability, the limits of B at the centre are very much smaller than at the surface. Finally, when the limits of B at the surface are great, corresponding to a small average permeability, the limits of B at the centre are again more nearly equal to those at the surface.

Referring to the average induction over the whole core, that is, taking account of phase displacement as well as variation in amplitude, it may be stated that as the limits of B at the surface increase from zero, the maximum average B over the whole area grows less than B at the surface and then more nearly approximates to it. The curves are similar to those in Fig. 1, but the percentage diminution for a given frequency and a given value of B at the surface is not so great.

The magnet was heated to 53° C. and the effect was to tend to equalise the limits of B over the whole core. In the figure the points ⊙ were obtained when the magnet was at this temperature. The same maximum average B over the whole core is obtained with slightly less amplitude of magnetising force. On account of a greater phase displacement of the change of induction as the centre is approached, the maximum average B over the whole section is not greatly altered for a given maximum value of B at the surface.

Chemical Society, April 18.—Prof. Emerson Reynolds, president, in the chair.—The following papers were read:—Action of alkyl haloids on aldoximes and ketoximes. Part 2. Alkylated oximes and isoximes and the constitution of aliphatic oximes, by W. R. Dunstan and E. Goulding.—The supposed existence of two isomeric triethyloxamines, by W. R. Dunstan and E. Goulding.—Nitrocamphene, aminocamphene and hydroxycamphene, by M. O. Forster. On treating 1:1-bromonitrocamphane with silver nitrate, 1-nitrocamphene,


$$C_8H_{14}\left\langle\begin{array}{l}CH\\ \parallel\\ C.NO_2\end{array}\right.,$$

is produced, and on reduction gives the corresponding 1-aminocamphene,  $C_8H_{14}\left\langle\begin{array}{l}CH\\ \parallel\\ C.NH_2\end{array}\right.$. On heating the sulphate of this base with potassium nitrite it is converted into 1-hydroxycamphene,  $C_8H_{14}\left\langle\begin{array}{l}CH\\ \parallel\\ C.OH\end{array}\right.$. This substance is of importance as being the enolic isomeride of ordinary camphor, into which it is converted by warm mineral acids.—A contribution to the chemistry of the triazoles, by G. Young and W. H. Oates. The authors discuss the possibility of isomerism in the triazole series as compared with the pyrazoles; they have prepared a number of substituted triazoles from the corresponding semicarbazones.—Researches on moorland waters. Part 2. On the origin of the combined chlorine, by W. Ackroyd. The author concludes that the common salt in the water of the Widdop reservoir in Yorkshire is derived from the winter rainfall.—Robinin, violaquercitrin and osyritrin, by A. G. Perkin. The composition $C_{33}H_{38}O_{20},8H_2O$ is now assigned to the glucoside robinin, which on hydrolysis yields a colouring matter, $C_{15}H_{10}O_6$, identical with campherol. Osyritrin has the composition

$$2C_{27}H_{28}O_{16},H_2O,$$

and is identical with violaquercitrin.—Preparation of orthodimethoxybenzoin, and a new method of preparing salicylaldehyde methyl ether, by J. C. Irvine. An excellent yield of salicylaldehyde methyl ether is obtained by treating a mixture of salicylaldehyde and methyl iodide with dry silver oxide; it is converted into orthodimethoxybenzoin by potassium cyanate, and this is converted quantitatively into its methyl ether by methyl iodide and silver oxide.—Action of hydroxylamine on the anhydrides of bromonitrocamphane, by M. O. Forster.—On the estimation of cocaine and on diiodococaine hydriodide, by W. Garsed and J. N. Collie. On adding excess of decinormal iodine solution to a dilute solution of a cocaine salt, diiodococaine hydriodide, $C_{17}H_{21}NO_4,HI,I_2$, is precipitated and the excess of iodine may be determined by titration with thiosulphate solution.—Note on acetonylacetone, by T. Gray. The molecular refraction of acetonylacetone agrees with the value required for the ketonic formula.—Condensation of acetonylacetone with hydrazine hydrate, by T. Gray.—Preparation of synthetical glucosides, by H. Ryan and W. S. Mills. Acetochlorogalactose reacts with α-naphthol and potash yielding α-naphthylgalactoside, $C_6H_{11}O_5.O.C_{10}H_7$. Metacresylglucoside is similarly prepared from acetochloroglucose and metacresol.—The influence of cane sugar on the conductivities of solutions of potassium chloride, hydrogen chloride and potassium hydroxide; with evidence of salt formation in the last case, by C. J. Martin and O. Masson.—The aluminium-mercury couple. Part 3. Chlorination of aromatic hydrocarbons in presence of the couple. The constitution of the dichlorotoluenes, by J. B. Cohen and H. D. Dakin.—A modification of Gutzeit's test for arsenic, by E. Dowzard.—On the chemistry of *Nerium odorum*, by R. C. L. Bose. In addition to neriodorein and neriodorin, already known to exist in the plant, the author has extracted a new resin-like substance from the sweet-scented oleander, *Nerium odorum*; this has the composition $C_{21}H_{49}O_6$, and is named karabin.—Change and interaction in organic compounds, by A. Lapworth.—The mechanism of the Claisen reaction, by A. Lapworth.—A new series of di-mercuri-ammonium salts, Part 1, by P. C. Rây. Ammonia acts on mercuric nitrite giving a di-mercuri-ammonium nitrite of the composition

$$2NHg_2NO_2,H_2O.$$

This yields salts of the types $NHg_2Cl,4HCl$ and $2NHg_2Cl,H_2O$, with the halogen acids.

Royal Microscopical Society, April 17.—Mr. Wm. Carruthers, F.R.S., president, in the chair.—Mr. Enock gave a demonstration on the metamorphoses of one of the dragon flies, *Æschna cyanea*. In his endeavours to obtain a complete set of photographs from life which would show every stage in the metamorphoses of the nymph of the dragon fly he had taken over 1000 photographs before he was successful; those he was about to show were taken from the same individual and recorded every stage of the process, which occupied a period of six hours only. Considerable patience and constant watching were required, as after the first indication of change was noticed the dragon fly might emerge at any time in the following three days, and when the process of emergence began it went on rapidly, so rapidly, in fact, that three photographs were taken within the space of six seconds. Mr. Enock then showed on the screen photographs of a nymph to illustrate the remarkable movements of the mask by which the insect was enabled to capture its prey. These were followed by a series of about thirty slides, illustrating every stage of the metamorphosis from the nymph to the perfect insect.—Mr. Nelson exhibited a slide of podura scales under polarised light.

Royal Meteorological Society, April 17.—Mr. W. H. Dines, president, in the chair.—Mr. W. Marriott read a paper on the special characteristics of the weather of March 1901. From March 1 to the 12th or 13th the temperature was slightly above the average, the prevailing winds being from the south-west and often strong in force. About the 13th a change set in, when north-easterly winds became predominant and low temperatures prevailed. This continued with increasing intensity until the 29th, the last two days of the month being nearly of average temperature. The most remarkable period of the month was the five days from the 25th to 29th, when the temperature was more than 10° below the average all over the country. The north-easterly winds were strong in force and particularly keen and dry. At the Greenwich Observatory the relative humidity was only 52 per cent. on the 26th and 54 per cent on the 27th. The only other instance during the past 54 years of as low a relative humidity in the month of March was on March 1, 1886. In consequence of this keen and cold weather, vegetation was at a standstill. Snow showers were frequent but not very heavy, except on the 20th in the south-west of England, when on Dartmoor nearly as much snow fell as in the great blizzard of March 1891; and on the 29th, when a very heavy fall of snow and rain occurred in the north-west of England and Wales. Although the death-rate was below the average, there was a considerable increase in the deaths due to diseases of the respiratory organs.—A paper by Mr. R. Strachan, on vapour tension in relation to wind, was also read.

Anthropological Institute, April 23.—Prof. A. C. Haddon, F.R.S., in the chair.—Specimens of Neolithic implements from the Wilts border of Berkshire were exhibited by Mr. L. J. Shirley.—Mr. Franklin White exhibited stone implements, pottery and silver ornaments from Central Rhodesia; he then read a paper on the ruins of Dhlo-Dhlo, or Mambo, illustrated by lantern slides, photographs and plans. The author gave a detailed description of the nature, dimensions, ornamentation and state of preservation of the ruins, and showed that the theories of the late Mr. Theodore Bent with regard to the Zimbabye ruins would not apply to the ruins of Dhlo-Dhlo, the orientation and other details depending mainly on the character of the ground.—Papers on the Baganda, by Rev. J. Roscoe, and on folktales of the New Hebrides, by Mr. S. H. Ray, were taken as read.

MANCHESTER.

Literary and Philosophical Society, April 23.—Prof. Horace Lamb, F.R.S., president, in the chair.—Dr. Elie Metchnikoff, Paris, was elected an honorary member of the society. Mr. Charles Bailey was elected president of the Society for the session 1901-2.—Prof. S. J. Hickson communicated two papers by Miss E. M. Pratt, upon a collection of Polychaeta from the Falkland Islands, and some notes on the bipolar theory of the distribution of marine organisms. In the first paper Miss Pratt described a small collection of Polychaeta collected in shallow water off the shores of the Falkland Islands. There are no new species, but considerable interest attaches to certain forms which are new to the southern hemisphere, amongst them being *Arenicola claparedii*, now recorded for the first time outside the northern temperate region. The second paper contained a review of the facts of zoology bearing upon the theory that the marine organisms found around the two poles of the earth have been derived from a common or universal fauna, which existed in the past history of the world, at a time when the seas were of a more uniform temperature. It was shown that the evidence in favour of the theory is increasing rapidly, and our knowledge of the details of anatomy of the north and south representative species reveals a closer relationship between them than might have been anticipated.

PARIS.

Academy of Sciences, April 29.—M. Fouqué in the chair.—On the mechanical compensation of the rotation of the optical field furnished by the siderostat and heliostat, by M. A. Cornu. The theoretical solutions of this problem given by Turner and by Lippmann have been anticipated practically by M. P. Gautier, who has devised a simple mechanism for moving the photographic plate with an angular compensating movement sufficiently precise to obtain a good negative with a short exposure (see p. 42).—On the use of oxygen in ascents at great heights, by M. L. Cailletet. A description of an apparatus by means of which liquid oxygen can be used by aëronauts. Its great practical service was demonstrated in a balloon ascent of 5500 metres.—On the stability of a system having a movement of rotation, by M. P. Duhem.—M. Zeiller was elected a member in the Section of Botany in the place of the late M. A. Chatin.—On a generalisation of a definite integral, by M. H. Lebesgue.—On the analytical integrals of differential equations of the first order in the neighbourhood of initial singular conditions, by M. Henri Dulac.—On the equations of certain groups, by M. de Seguier.—On the laws of Belgrand and the formulæ for the delivery of a water-course, by M. Edmond Maillet.—The isochores of ether from 1·0 to 1·85 c.c., by M. Edouard Mack. The experiments confirm the law of Amagat that at constant volume the pressure is a linear function of the temperature.—On the measurement of the period of electric oscillations by the rotating mirror, by M. L. Décombe. A discussion of the precision to be obtained by means of the rotating mirror method and a criticism of results previously published on the same subject by M. Tissot.—On the band spectrum of nitrogen in the oscillating spark, by M. G. A. Hemsalech. It is shown that the band spectrum obtained with the oscillating spark with certain metals is identical with the band spectrum of nitrogen at the negative pole.—The rapid measurement of surface tensions, by MM. Ph. A. Guye and L. Perrot. A study of the conditions under which the method of falling drops gives accurate results for the surface tension of liquids.—On the variation of composition of mineral waters and of spring waters as brought out with the aid of the electric conductivity, by M. P. Th. Muller. The composition of a water having been once determined chemically any variation of its composition from time to time can be most easily detected by determining its electrical conductivity.—On myrcenol and its composition, by M. Ph. Barbier. By studying the oxidation products of this substance it would appear to have the same constitution as that attributed to licareol by Tiemann, but as the physical and chemical properties of myrcenol are altogether distinct from those of licareol it is necessary to reconsider the formula attributed to the latter substance.—On ethyl nitroacetate, by M. A. Wahl. Since the substance obtained by the action of ammonia upon ethyl nitro-dimethylacrylate gave an ethyl nitroacetate which was not identical with the specimen obtained by M. de Forcrand, an attempt was made to prepare this compound by an independent method. The decomposition of ethyl nitromalonate by boiling with potash was finally found to give the compound sought for, which agreed in its properties with the ester previously prepared by the author, but differs from the nitroacetate of de Forcrand.—The preparation of the isomeric ortho-, meta- and para-nitrobenzoylcyanacetic esters and of orthonitrobenzoyl chloride, by M. Mavrojannis.—A new reaction of saccharin, by M. Alex. Leys.—On the migration of nitrogenous and ternary matters in annual plants, by M. G. André.—On the *Voandzou*, by M. Balland. An analysis of the seeds of this plant showed that the proportions of fat, nitrogenous material, starch and ash are exactly those required for human food. It is the first example of a natural product presenting the chemical characteristics of a perfect food.—Contribution to the microchemical examination of alkaloids, by M. M. E. Pozzi-Escot.—On the phenomena of histolysis and histogenesis accompanying the development of the endoparasitic Trematods of terrestrial mollusca, by MM. Vaney and A. Conte.—On the evolution of the blastodermic leaflets in the Nematods, by M. A. Conte.—On a new subfamily of marine Hemiptera, the *Hermatobatinae*, by MM. H. Coutière and J. Martin.—Researches on the physical constants which influence the electrical stimulation of the nerve, by M. Georges Weiss.—The direct measurement of the wave-length in a nerve following short electrical stimulations, by M. Aug. Charpentier.—Some remarks on the otoliths of the frog, by M. Marage.—The influence of the sterilisation of the medium, the air respired and the food absorbed upon the animal organism, by MM. Charrin and Guillemonat. The comparative experiments upon guinea-pigs would tend to show that the absence of bacteria in the air and food is distinctly prejudicial to the animal, which loses its vitality and resisting power to disease.

DIARY OF SOCIETIES.

THURSDAY, May 9.

Royal Society, at 4.30.—Discussion of Special Report.

Mathematical Society, at 5.30.—(1) A Case of Algebraic Partitionment; (2) On the Series whose Terms are the Cubes and Higher Powers of the Binomial Coefficients: Major MacMahon, R.A., F.R.S.—A Property of Recurring Series: G. B. Mathews, F.R.S.—The Product of Two Spherical Surface Harmonic Functions: J. B. Dale.

Institution of Electrical Engineers, at 8.—Storage Batteries in Electric Power Stations, controlled by Reversible Boosters: J. S. Highfield.

Iron and Steel Institute, at 10.30.—Annual Meeting.

FRIDAY, May 10.

Royal Institution, at 9.—The Response of Inorganic Matter to Mechanical and Electrical Stimulus: Prof. J. C. Bose.

Physical Society, at 5.—Applications of Elastic Solids to Metrology: Dr. C. Chree, F.R.S.—The Thermal Properties of Isopentane compared with those of Normal Pentane: Prof. S. Young, F.R.S., and J. Rose-Innes.

Society of Arts, at 8.—Polyphase Electric Working: Alfred C. Eborall.

Malacological Society, at 8.—Description of a New Species of Voluta from Natal, with a List of the Known Forms of Volutidæ from South Africa: E. A. Smith.—Description of a New Species of Voluta, *Cymbiola mangeri*: H. B. Preston.—On Three New Operculates (Cyclotus) from Columbia: S. I. Da Costa.

Royal Astronomical Society, at 5.—Results of Double Star Measures made at Windsor, New South Wales, in the Years 1899 and 1900: John Tebbutt.—The Visual Spectrum of Nova Persei: Rev. A. L. Cortie.—The Spectrum of Nova Persei, Note 4: Rev. W. Sidgreaves.——*Probable Papers*: Additional Note on the Position of Nova Persei, and a Comparison of Photographic Magnitudes of Neighbouring Stars with those of Father Hagen's Chart and Catalogue: F. A. Bellamy.—The Cambridge Machine for Measuring Celestial Photographs: A. R. Hinks.—Further Observations of the New Star in Perseus: Radcliffe Observatory, Oxford.

SATURDAY, May 11.

Royal Institution, at 3.—The Rise of Civilisation in Egypt: Prof. W. M. Flinders Petrie.

MONDAY, May 13.

Royal Geographical Society, at 8.30.—A Survey in Baffinland: Dr. Robert Bell, F.R.S.—Explorations in the Great Bear Lake Region: J. Mackintosh Bell.

Society of Arts, at 8.—Alloys: Sir W. C. Roberts-Austen, K.C.B., F.R.S.

TUESDAY, May 14.

Royal Institution, at 3.—Cellular Physiology: Dr. A. Macfadyen.

WEDNESDAY, May 15.

Royal Meteorological Society, at 4.30.—The Periodicity of Cyclonic Winds: Rupert T. Smith.—An Account of the Bequest by the late G. J. Symons, F.R.S., to the Royal Meteorological Society: William Marriott.

Royal Microscopical Society, at 8.—Exhibition of Aquatic Life.

Society of Arts, at 8.—Syntonic Wireless Telegraphy: Guglielmo Marconi.

THURSDAY, May 16.

Chemical Society, at 8.—The Nutrition of Yeast, Part III.: Dr. A. L. Stern.—Derivatives of Methylfurfural: H. J. H. Fenton and Miss Mildred Gostling.—The Preparation and Optical Inversion of Optically Active Nitrogen Compounds, dextro- and Lævo-α-benzylphenyl-allylmethylammonium Salts: W. J. Pope and A. W. Harvey.

FRIDAY, May 17.

Royal Institution, at 9.—Turkish Kurdistan: Earl Percy.

Society of Arts, at 8.—Polyphase Electric Working: A. C. Eborall.

SATURDAY, May 18.

Royal Institution, at 3.—Rise of Civilisation in Egypt: Prof. W. M. Flinders Petrie.

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